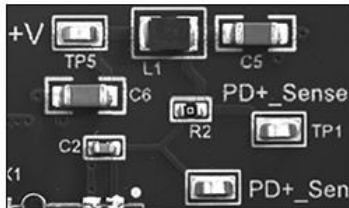




Products Home / Scientific Cameras / 1.6 MP CMOS Compact Scientific Cameras

1.6 MP CMOS Compact Scientific Cameras

- ▶ Monochrome and Color CMOS Cameras
- ▶ High Quantum Efficiency and Low <math><4.0 e^-</math> Read Noise
- ▶ Versions Available with External Hardware Triggers



This monochrome image of a printed circuit board was acquired using an MVL50M23 Machine Vision Lens mounted to a CS165MU1 Camera using an SM1A10Z Adapter. [Click here](#) for the TIFF file.

CS165MU1
Monochrome CMOS Camera
with External Hardware Trigger



Related Items

- Other Scientific-Grade Camera
- Machine Vision Camera Lens
- Objective and Scan Lenses
- SM1-Threaded Adapters

- Overview
- Specs
- Triggering
- Software
- We're All Ears
- Feedback
- Selection Guide

Features

- Monochrome or Color CMOS Sensor
- 1/2.9" Format, 1440 x 1080 Pixel (1.6 MP) Sensor with 3.45 μ m Square Pixels
- Ultra-Compact Housing: 0.59" x 1.72" x 1.86"
- SM1-Threaded (1.035"-40) Aperture:
 - Requires SM1A10 Adapter for CS-Mount Lenses (Not Included)
 - Requires SM1A10Z Adapter C-Mount Lenses (Not Included)
- High Quantum Efficiency (69% at 575 nm for Monochrome Version)
- <math><4.0 e^-</math> RMS Read Noise
- Global Shutter for Imaging Rapidly Changing Scenes
- Versions Available with External Hardware Triggers
- USB 3.0 Interface
- Compatible with [30 mm Cage System](#)
- Available with Either 1/4"-20 or M6 Tapped Holes for Post Mounting

Software

- ThorCam™ Software for Windows® 7 and 10 Operating Systems
- SDK and Programming Interfaces Provide Support for:
 - C, C++, C#, Python, and Visual Basic .NET APIs
 - LabVIEW, MATLAB, and μ Manager Third-Party Software

Thorlabs' ultra-compact, lightweight Zelux™ Cameras with CMOS Sensors are designed to provide the imaging performance of a scientific camera at the price of a typical general-purpose camera. These cameras offer low read noise and high sensitivity while maintaining a small footprint. The global shutter captures the entire field of view simultaneously, allowing for imaging of rapidly changing scenes.

Each CMOS camera has a USB 3.0 interface and can be controlled through our ThorCam software; see the *Software* tab for more information. Versions are available with or without MMCX connectors for external triggering to synchronize image capture with other devices. Two MMCX-to-BNC cables (item # CA3339) are included with versions that have external hardware triggers.

The aperture of each camera has SM1 (1.035"-40) threading for compatibility with [Ø1" Lens Tubes](#), CS- and C-Mount (1.000"-32) adapters are available below for compatibility with many microscopes, [machine vision camera lenses](#), and [C-mount extension tubes](#). These cameras are available with either monochrome or color CMOS sensors. The monochrome cameras feature a clear AR-coated window, while the color cameras feature an IR blocking filter that cuts off transmission above 650 nm. Each optic can be removed and replaced with another Ø25 mm or Ø1" optic up to 1.27 mm thick. The window and filter are held in place by an [SM1RR](#) Retaining Ring, which can be tightened using an [SPW602](#) or [SPW606](#) Spanner Wrench (sold separately).

Two 1/4"-20 or M6 tapped holes on adjacent sides of each Zelux camera housing provide compatibility with Ø1" [pedestal](#) or [pillar](#) posts and many standard tripod mounts. Four 4-40 tapped holes on the front of the housing allow the camera to be mounted into our [30 mm cage system](#). The combination of flexible mounting options and compact size makes these cameras an ideal choice for integrating into lab-built imaging systems as well as those based on commercial microscopes.



[Click to Enlarge](#)
All Zelux Cameras are shipped with an [SM1EC2B](#) snap-on lens cap to protect the sensor while cameras are not in use.

Jason Mills
General Manager,
Thorlabs Scientific Imaging

Feedback?
Questions?
Need a Quote?

[Contact Me](#)

Scientific Camera Selection Guide		
Compact Scientific	Zelux™ (Smallest Profile)	1.6 MP CMOS
	Kiralux™	1.3 MP CMOS
		2.3 MP CMOS
		5 MP CMOS
		5 MP CMOS, Polarization Sensitive
Quantalux® (<math><1 e^-</math> Read Noise)	2.1 MP sCMOS	
Scientific CCD	1.4 MP CCD	
	4 MP CCD	
	8 MP CCD	
	VGA Resolution CCD (200 Frames Per Second)	

Zelux Mounting Features

- [Click to Enlarge](#)
An [MVL16M23](#) C-Mount Machine Vision Lens is installed on a Zelux camera using an SM1A10Z adapter.
- [Click to Enlarge](#)
An [SM1 Lens Tube](#) is installed on a Zelux camera using the SM1-threaded aperture.
- [Click to Enlarge](#)
Four 4-40 tapped holes allow [30 mm Cage System](#) components to be attached to the camera. Pictured is our [CP13](#) Cage Plate with C-Mount Threading.
- [Click to Enlarge](#)
A CS165MU1 Zelux camera is mounted on a [Ø1" pedestal post](#) using the 1/4"-20 tapped hole on the bottom of the housing.

Zelux™ 1.6 MP Monochrome and Color CMOS Compact Scientific Digital Cameras



[Zoom](#)

Key Specifications ^a				
Item #	CS165MU(/M)	CS165MU1(/M)	CS165CU(/M)	CS165CU1(/M)
Sensor Type	Monochrome CMOS		Color CMOS	
Hardware Trigger/Strobe	No	Yes	No	Yes
Peak Quantum Efficiency (Click for Graph)	69% at 575 nm		65% at 535 nm	
Removable Optic	AR-Coated Window, R _{avg} < 0.5% per Surface (400 - 700 nm)		IR Blocking Filter	
Mounting Features	Imperial: Two 1/4"-20 Taps for Post Mounting, 30 mm Cage Compatible Metric: Two M6 Taps for Post Mounting, 30 mm Cage Compatible Taps are on Adjacent Sides of the Housing			

a. For complete specifications, please see the Specs tab.

Based on your currency / country selection, your order will ship from Newton, New Jersey

+1	Qty	Docs	Part Number - Imperial	Price	Available
	<input type="text"/>		CS165MU NEW! Zelux™ 1.6 MP Monochrome CMOS Camera, 1/4"-20 Taps	\$435.00	Today
	<input type="text"/>		CS165CU NEW! Zelux™ 1.6 MP Color CMOS Camera, 1/4"-20 Taps	\$435.00	Today
	<input type="text"/>		CS165MU1 NEW! Zelux™ 1.6 MP Monochrome CMOS Camera, 1/4"-20 Taps, External Trigger	\$535.00	Today
	<input type="text"/>		CS165CU1 NEW! Zelux™ 1.6 MP Color CMOS Camera, 1/4"-20 Taps, External Trigger	\$535.00	Today

+1	Qty	Docs	Part Number - Metric	Price	Available
	<input type="text"/>		CS165MU/M NEW! Zelux™ 1.6 MP Monochrome CMOS Camera, M6 Taps	\$435.00	Today
	<input type="text"/>		CS165CU/M NEW! Zelux™ 1.6 MP Color CMOS Camera, M6 Taps	\$435.00	Today
	<input type="text"/>		CS165MU1/M NEW! Zelux™ 1.6 MP Monochrome CMOS Camera, M6 Taps, External Trigger	\$535.00	Today
	<input type="text"/>		CS165CU1/M NEW! Zelux™ 1.6 MP Color CMOS Camera, M6 Taps, External Trigger	\$535.00	Today

Add To Cart

Optional Accessories for Zelux™ 1.6 MP CMOS Cameras



[Zoom](#)

Each Zelux™ camera is shipped with a USB3-MBA-118 USB 3.0 Cable and a [SM1EC2B](#) snap-on lens cap. The CS165MU1(/M) and CS165CU1(/M) Zelux cameras, which have external connections for triggering, are also shipped with two CA3339 MMCX-to-BNC cables. Additional accessories are available below.

USB 3.0 Camera Accessories (USB3-MBA-118 and USB3-PCIE)

We offer a USB 3.0 A to Micro B cable for connecting our cameras to a PC (please note that one cable is included with each camera). The cable measures 118" long and features screws on either side of the Micro B connector that mate with tapped holes on the camera for securing the USB cable to the camera housing. When operating USB 3.0 cameras it is strongly recommended that the Thorlabs-supplied USB 3.0 cable be used, with the retention screws securely fastened. Due to the high data rates involved, users may experience problems when using generic USB 3.0 cables.

All Zelux cameras may be connected directly to the USB 3.0 port on a laptop or desktop computer. Host-side USB 3.0 ports are often blue in color, although they may also be black in color, and are typically marked "SS" for SuperSpeed. A USB 3.0 PCIe card is sold separately for computers without an integrated Intel USB 3.0 controller. Note that the use of a USB hub may impact performance. A dedicated connection to the PC is preferred.

Trigger and Strobe Cables (CA3339 and CA3439)

The CA3439 MMCX-to-SMA cable and the CA3339 MMCX-to-BNC cable are both 1 m long RG-174 coaxial cables with male to male connectors. Both feature a DC to 6 GHz frequency range, 50 Ω impedance, and 170 V max voltage. Full details are provided at the [full web presentation](#).

Adapters for C- and CS-Mount Lenses (SM1A10 and SM1A10Z)

We also offer adapters for mounting C- and CS-Mount lenses to Zelux cameras. Our SM1A10 and SM1A10Z adapters have internal C-Mount (1.00"-32) threading and external SM1 (1.035"-40) threading for mounting to the SM1-threaded aperture of each Zelux camera. CS- and C-Mount standards both use 1.00"-32 threads, but C-Mount lenses have a flange focal distance (FFD) that is 5 mm longer than the FFD of CS-Mount lenses. When used with a Zelux camera, our SM1A10 adapter provides the correct FFD for CS-Mount lenses, while our SM1A10Z adapter provides the correct FFD for C-Mount lenses.



[Click to Enlarge](#)

Based on your currency / country selection, your order will ship from Newton, New Jersey

+1	Qty	Docs	Part Number - Universal	Price	Available
	<input type="text"/>		USB3-MBA-118 USB 3.0 A to Micro B Cable, Length: 118" (3 m)	\$38.69	Today
	<input type="text"/>		USB3-PCIE USB 3.0 PCI Express Expansion Card	\$66.28	Today
	<input type="text"/>		CA3439 NEW! RG-174 Coaxial Cable, MMCX Male to SMA Male, 1 m (39")	\$28.00	Today
	<input type="text"/>		CA3339 NEW! RG-174 Coaxial Cable, MMCX Male to BNC Male, 1 m (39")	\$26.00	Today
	<input type="text"/>		SM1A10 Adapter with External SM1 Threads and Internal C-Mount Threads	\$20.78	Today
	<input type="text"/>		SM1A10Z NEW! Adapter with External SM1 Threads and Internal C-Mount Threads, 9.1 mm Spacer	\$24.00	Today

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